

Quantitative Usage Analysis for Carbaryl

Case Number: 0080

PC Code: 56801

Date: December 17, 2002

Analyst: Frank Hernandez

Based on available pesticide survey usage information for the years of 1992 through 2001, an annual estimate of carbaryl total domestic usage averaged approximately one million nine hundred thousand pounds active ingredient (a.i.) for about one million three hundred thousand acres treated. Carbaryl is an insecticide with its largest markets in terms of total pounds active ingredient allocated to apples (13%), pecans (10%), grapes (7%), alfalfa (6%), oranges (6%), and corn (6%). Most of the usage is in CA, MI, IN, IL, OH, TX, GA, OK, MS, and AR.

Crops with a high percentage of the total U.S. planted acres treated include avocados (38%), asparagus (35%), okra (33%), cranberries (32%), and apples (24%).

Crops with less than 1 percent of the crop treated include sugar cane, woodland, wheat, corn, oats, sod, soybeans, cotton, sorghum, canola, sunflower, flax, sweet corn, alfalfa, walnuts, green peas, dry beans, and safflower.

Site	Acres Grown (000)	Acres Treated (000)		% of Crop Treated		LB AI Applied (000)		Average Application Rate			States of Most Usage
		Wtd Avg	Est Max	Wtd Avg	Est Max	Wtd Avg	Est Max	lb ai/ acre/y r	#appl / yr	lb ai/ A/appl	(% of total lb ai used on this site)
Alfalfa	22,745	118	254	0.52	1.12	121	351	1.0	1.0	1.0	NE SD OK MT ND IL 80%
Almonds	427	3	6	0.70	1.41	6	15	2.0	1.0	2.0	CA 100%
Apples	587	139	207	23.68	35.26	242	296	1.7	1.4	1.2	WA MI NY CA CT IN 80%
Asparagus	92	32	41	34.78	44.57	36	49	1.1	1.2	0.9	MI WA 95%
Avocados	81	31	53	38.27	65.43	1	2	0.0	1.5	0.0	
Beans, Dry	1,825	10	48	0.55	2.63	4	19	0.4	1.0	0.4	CA ND CO 80%
Beans, Lima, Fresh	5	0	0	3.00	8.00	0	1	1.7	1.2	1.4	GA 100%
Beans, Snap, Fresh	83	8	12	9.64	14.46	11	18	1.4	1.6	0.9	NC FL 85%
Beans, Snap, Proc.	230	22	32	9.57	13.91	26	41	1.2	1.6	0.7	IL OR 85%
Beets	11	2	3	16.36	26.36	1	2	0.5	1.0	0.5	WI TX OR 95%
Blackberries	6	1	2	18.33	30.00	2	3	1.9	1.0	1.9	OR 100%
Blueberries	60	13	26	21.93	43.86	26	53	2.0	1.2	1.7	MI NJ 85%
Broccoli	115	3	7	2.61	6.09	2	6	0.7	1.0	0.7	CA OR TX 85%
Brussels Sprouts	3	0	1	15.04	37.61	0	1	0.8	1.1	0.7	
Cabbage, Chinese	10	2	4	18.24	38.50	1	2	0.6	1.1	0.5	CA 80%

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Cabbage, Fresh	83	2	4	1.81	4.94	3	5	2.0	1.6	1.2	NC NY 85%
Canola	37	0	2	0.35	4.59	0	1	0.5	1.0	0.5	MT 100%
Cantaloupes	115	10	15	8.70	13.04	11	17	1.1	1.1	1.0	CA IL GA TX 80%
Carrots	109	4	7	3.67	6.42	9	21	2.2	2.5	0.9	WI MI NY 90%
Cauliflower	59	1	2	1.10	2.54	1	2	1.2	1.0	1.2	OR CA WA 85%
Celery	38	1	2	1.45	4.21	1	3	1.8	1.8	1.0	MI WI 90%
Cherries, Sweet	49	11	16	22.45	32.65	30	44	2.7	1.4	1.9	WA MI CA 85%
Cherries, Tart	51	5	10	9.80	19.61	12	25	2.4	1.3	1.9	MI NY 90%
Collards	10	0	1	4.50	10.90	0	1	0.8	1.0	0.8	NJ 88%
Corn	71,693	78	148	0.11	0.21	103	197	1.3	1.3	1.0	MO NE MS IN IL 50%
Cotton	11,874	23	69	0.19	0.58	28	83	1.2	1.1	1.1	TN MS TX CA 85%
Cranberries	31	10	21	32.26	67.74	21	39	2.1	1.0	2.1	WI MA 95%
Cucumbers	147	10	32	6.80	21.77	12	31	1.2	1.0	1.2	NC SC NY VA DE 70%
Cucumbers, Proc.	119	3	10	2.52	8.40	5	12	1.7	2.2	0.8	NC MI 80%
Eggplant	120	7	16	5.83	13.33	10	37	1.4	2.1	0.7	FL NJ TX IL CA 65%
Flax	175	1	2	0.45	1.03	1	2	1.1	1.0	1.1	ND 100%
Grapefruit	201	12	22	5.97	10.95	27	41	2.2	1.6	1.4	FL TX 95%

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Grapes	851	58	88	6.82	10.34	134	201	2.3	1.6	1.4	NY CA OR PA MI AR 80%
Hazelnuts (Filberts)	25	1	2	2.80	8.00	2	6	2.9	1.0	2.9	
Lemons	67	1	2	1.49	2.99	2	8	2.0	1.3	1.5	CA 90%
Lettuce, Head	210	4	9	1.90	4.29	5	11	1.2	1.2	1.0	CA 80%
Melons, Honeydew	28	3	10	10.71	35.71	3	8	1.0	1.2	0.8	CA 100%
Nectarines	31	2	4	6.45	12.90	7	16	3.5	1.1	3.2	CA 90%
Oats/Rye	6,225	7	17	0.11	0.27	5	12	0.7	1.0	0.7	MN MS ND TX MT MI 75%
Okra	3	1	2	33.33	53.33	2	4	1.7	1.0	1.7	TX 85%
Olives	30	2	4	6.67	13.33	11	27	5.5	1.0	5.5	CA 100%
Onions, Dry	159	5	17	3.14	10.69	22	69	4.4	7.0	0.6	MI 100%
Oranges	874	21	34	2.40	3.89	105	158	5.0	1.3	3.8	CA FL 99%
Pasture	87,540	29	71	0.03	0.08	27	79	0.9	1.0	0.9	NC TX SC NE LA 85%
Peaches	221	19	27	8.60	12.22	62	115	3.3	2.8	1.2	GA CA TX SC MI 70%
Peanuts	1,640	45	87	2.74	5.30	48	98	1.1	1.4	0.8	GA NC AL VA 80%
Pears	80	2	4	2.50	5.00	3	7	1.5	1.5	1.0	WA OR CA PA NY OH 75%
Peas, Dry	237	3	11	1.27	4.64	3	12	1.0	1.0	1.0	WA ID TX 90%
Peas, Green	390	2	5	0.51	1.28	3	7	1.5	1.0	1.5	MN OR 80%

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Peas, Green, Proc.	331	2	8	0.60	2.42	3	8	1.5	1.0	1.5	OR 100%
Pecans	492	76	89	15.45	18.09	207	495	2.7	2.2	1.3	GA TX SC 90%
Peppers, Bell	57	3	7	5.26	12.28	4	9	1.3	1.7	0.8	FL CA MI 90%
Peppers, Sweet	78	6	11	7.69	14.10	8	15	1.3	1.0	1.3	CA FL KY LA IL 80%
Pistachios	53	7	18	13.21	33.96	23	64	3.3	1.0	3.3	CA 80%
Plums	65	3	5	4.62	7.69	11	21	3.7	1.0	3.7	CA 80%
Potatoes	1,421	24	38	1.70	2.68	34	50	1.4	1.7	0.8	ND WA MI ID FL NY 59%
Pumpkins	38	7	9	18.42	23.68	21	42	3.0	1.5	2.0	IL MI NY OH 80%
Raspberries	12	0	1	2.50	6.67	1	2	2.7	1.0	2.7	OR MI 90%
Rice	3,105	29	37	0.93	1.19	25	47	0.9	1.1	0.8	TX CA 80%
Safflower	110	1	6	0.91	5.36	0	2	0.3	1.0	0.3	CA 100%
Sod	147	0	4	0.14	2.93	0	8	2.0	1.0	2.0	TX NH 100%
Sorghum	10,850	19	41	0.18	0.38	25	54	1.3	1.2	1.1	MO KS TX LA NE MS 75%
Soybeans	63,543	95	185	0.15	0.29	74	146	0.8	1.0	0.8	MN NE SD NC IL 60%
Squash	54	7	13	12.96	24.07	9	17	1.3	1.0	1.3	NJ FL MI CA NY TX 90%
Strawberries	52	9	14	17.31	26.92	25	57	2.8	2.1	1.3	CA FL NC PA 80%
Sugar Beets	1,312	19	42	1.45	3.20	28	114	1.5	1.1	1.3	CA TX WA MN OR 80%

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Sugarcane	845	0	1	0.04	0.07	0	0	0.2	1.1	0.1	FL 100%
Sunflower	2,820	10	38	0.35	1.35	7	29	0.7	1.1	0.7	SD ND 90%
Sweet Corn, Fresh	235	7	16	2.98	6.81	23	47	3.3	2.5	1.3	CA MI IL 80%
Sweet Corn, Proc.	540	5	15	0.93	2.78	12	42	2.4	2.9	0.8	IL 100%
Sweet Potatoes	89	15	34	16.85	38.20	24	53	1.6	1.0	1.6	LA MS NC 85%
Tobacco	702	9	18	1.28	2.56	16	42	1.8	1.5	1.2	NC KY SC TN 85%
Tomatoes, Fresh	138	8	14	5.80	10.14	15	31	1.9	2.6	0.7	CA FL TX 85%
Tomatoes, Proc.	341	21	31	6.16	9.09	31	78	1.5	1.2	1.2	CA 97%
Walnuts	206	1	3	0.53	1.50	2	5	1.9	1.1	1.7	CA 100%
Watermelons	261	22	31	8.43	11.88	11	23	0.5	1.0	0.5	FL GA NC TX 75%
Wheat, Spring	20,845	22	45	0.11	0.22	14	29	0.6	1.0	0.6	ND MN MT 90%
Wheat, Winter	44,762	45	98	0.10	0.22	38	69	0.8	1.0	0.8	KY NC TX WY OR MD 70%
Woodland	63,750	32	73	0.05	0.11	28	56	0.9	1.2	0.7	PA MI ND OH IA 80%
		1,271	1,842			1,917	2,914				

COLUMN HEADINGS

Wtd Avg = Weighted average--the most recent years and more reliable data are weighted more heavily.

Est Max = Estimated maximum, which is estimated from available data.

Average application rates are calculated from the weighted averages.

NOTES ON TABLE DATA

Usage data primarily covers 1992 - 2001. Calculations of the above numbers may not appear to agree because they are displayed as rounded to the nearest 1000 for acres treated or lb. a.i. (Therefore 0 = < 500) to two decimal percentage points for % of crop treated.

SOURCES: EPA data, USDA, and National Center for Food and Agricultural Policy

R.E.D. Use Profile Report

A. Chemical Overview

Chemical Name: Carbaryl

Case No: 0080

Chemical Code: 056801

B. Use Profile

Type of Pesticide: Acaricide/Insecticide and Plant regulator

Mode of Action: Acetylcholine esterase inhibitor

Use Sites:

Terrestrial Food Crop

Cucurbits - Cumber, Melons, Chinese okra, pumpkin, and squash

Flavoring and Spice Crops - Dill

Fruiting Vegetables - Eggplant and Pepper

Grain Crops - Proso millet

Leafy and Stem Vegetables - Beets, Broccoli, Brussels sprouts, Cabbage, Chinese cabbage, Cauliflower, Celery, Swiss chard, Collards, Dandelion, Endive (Escarole), Hanover Salad, Kale, Kohlrabi, Lettuce (Head, Crisphead types, Leaf types), Mustard, Parsley, Rhubarb, and Spinach

Miscellaneous Fruits - Avocado, Olive, Pricklypear

Miscellaneous Vegetables - Asparagus

Nut Crops - Almond, Chestnut, Filbert (Hazelnut), Pecan, Pistachio, and Walnut (English/black)

Pome Fruits - Crabapple, pear, and quince

Root Crop Vegetables - Beets, Carrot (including tops), Horseradish, Radish, Rutabaga, Salsify, and Sweet Potato

Small Fruits - Blackberry, Blueberry, Boysenberry, Caneberries, Cranberry, Dewberry, Loganberry, Raspberry (Black, Red), and Strawberry

Specialized Field Crops - Okra

Stone Fruits - Apricot, Cherry, Nectarine, Peach, Plum, and Prune

Terrestrial Food+Feed Crop

Citrus Fruits - Citrus fruits

Crops Grown for Oil - Field corn, Flax, and Sunflower

Fiber Crops - Flax

Fruiting Vegetables - Tomato

Grain Crops - Field corn, Rice, Sorghum and Wheat

Groups of Agricultural Crops Which Cross Established Crop Groupings - Cotton, Peanuts, Peas, Sorghum, Soybeans, and Vegetables

Leafy and Stem Vegetables - Mustard and Turnip

Nut Crops - Almond, and Tree nuts

Pome Fruits - Apple and Pome Fruits

Root Crop Vegetables - Parsnip, White/Irish potato, Salsify, and Turnip

Seed and Pod Vegetables - Beans
(Dried type), Succulent beans
(Lima and Snap),
Cowpea/Blackeyed pea,
Cowpea/Sitao, Lentils,
Peanuts, Peas (Dried type),
Field peas, Southern peas,
Succulent peas, and Soybeans
(edible)

Small Fruits - Grapes and Small fruits

Specialized Field Crops - Pop corn, Sweet corn, and Sunflower

Sugar Crops - Sugar beet

Terrestrial Feed Crop

Forage Grasses - Corn, Grass forage/fodder/hay, Millet (Proso), Pastures, Rangeland, Rice, Sorghum, and Wheat

Forage Legumes and Other Nongrass Forage Crops - Alfalfa, Clover, Cotton, and Trefoil

Grain Crops - Proso millet

Groups of Agricultural Crops Which Cross Established Crop Groupings - Grasses grown for seed

Terrestrial non-food crop

Agricultural Uncultivated Areas - Agricultural fallow/idleland and Agricultural rights-of way/fencerows/hedgerows

Commercial/Industrial/Institutional Premises and Equipment

Commercial/Institutional/Industrial

premises/Equipment (Outdoor)

Fiber Crops

Forest Trees - Christmas tree plantations

Groups of Agricultural Crops Which Cross established Crop Groupings - Fruits (unspecified)

Miscellaneous Fruits - Longan and Mango

Nonagricultural Uncultivated Areas - Outdoor buildings/structures, rights-of-way/fencerows/hedgerows, uncultivated areas/soils, and recreational areas

Ornamental Lawns and Turf - Commercial/Industrial lawns, Golf course turf, Ornamental sod farm (turf), and recreational area lawns

Specialized Field Crops - Tobacco

Wide Area/General Outdoor Treatments - Fencerows/Hedgerows, Urban areas, and Wide area/General outdoor treatment (Public health use)

Terrestrial non-food+outdoor residential

Nonagricultural Uncultivated Areas - Rights-of-way/Fencerows/Hedgerows

Ornamental Herbaceous Plants

Ornamental Lawns and Turf

Ornamental Nonflowering Plants

Ornamental Woody Shrubs and Vines

Ornamental and/or Shade Trees

Wide Area/General Outdoor Treatments - Fencerows/Hedgerows

Terrestrial+Greenhouse non-food crop

Ornamental Herbaceous Plants

Ornamental Woody Shrubs and Vines

Ornamental and/or Shade Trees

Aquatic food crop

Aquatic Sites - Commercial fishery water systems

Grain Crops - Rice

Small Fruits - Cranberry

Aquatic non-food industrial

Aquatic Sites - Drainage systems

Forestry

Forest Trees - Forest plantings (Reforestation programs, tree farms, tree plantations, etc), forest trees (all or unspecified), maple (forest), and Shelterbelt plantings

Outdoor residential

Households/Domestic Dwellings - Outdoor premises
Ornamental Herbaceous Plants
Ornamental Lawns and Turf - Residential lawns
Pets - Pet living/sleeping quarters

Indoor food
Poultry - Egg/Meat

Indoor non-food
Pets

Target Pests for Single Active Ingredient:

Invertebrates (insects and related organisms);

Adelgid (Cooley spruce gall)
Ataenius (Black turfgrass)
Ants (Carpenter, Fire, Imported fire)
Aphids (Apple, Balsam twig, Black cherry, Blackmargined, Cooley spruce gall, Eastern spruce gall, Elm leaf, European raspberry, Filbert, Gall, Mealy plum, Rose, Rosy apple, Wooly?, Wooly apple)
Appleworm (Lesser)
Armyworm (Fall, True, Western yellowstriped, Yellowstriped)
Bagworm
Bees
Beetle (Asparagus, Bean leaf, Beet leaf, Blister, Cereal leaf, Chafer, Colorado potato, Corn rootworm, Cucumber, Darkling, Darkling ground?, Elm bark, Elm leaf, Engraver, European alfalfa, Flea, Fuller rose, Green june, Ips engraver, Japanese, June, Litter, May, Mexican bean, Mountain pine, Rose, Roundheaded pine, Sap, Spruce bark?, Spruce?, Striped blister, Sunflower, Tobacco flea, Tortoise, Western pine, Whitefringed, Willow leaf)
Billbugs (Bluegrass)
Borer (European corn, Lesser peachtree, Limabean pod, Locust, Olive ash, Peach twig, Southwestern corn, West Indian sugarcane root)
Budworm (Jack pine, Spruce, Tobacco, Western spruce)
Bug (Bed, Black Grass, Boxelder, Chinch, Harlequin, Lace, Lygus, Plant, Squash, Stink, Tarnished plant)
Cabbageworm (Imported)
Cankerworm (Fall, Spring)

Casebearer (Pecan nut)
Caterpillar (Alfalfa, Eastern tent, Forest tent, Oleander, Painted lady, Puss, Range, Redhumped, Saltmarsh, Spiny elm, Spring elm, Tent, Thistle butterfly, Velvetbean, Walnut, Woollybear)
Centipedes
Chafer (European, Rose)
Chiggers (Redbugs)
Cicada (Apache, Periodical)
Clipper (Strawberry)
Cloverworm (Green)
Cockroach (American, Australian, Brown, Smoky brown)
Colaspis (Grape)
Crickets (Mole, Mormon, Snowy tree)
Curculio (Cowpea, Plum)
Cutworm (Army, Citrus, Cotton, Western bean)
Earwigs (European)
Earworm (Corn)
Firebrats
Fireworm (Cranberry, Yellowheaded)
Fleahopper (Cotton)
Fleas
Fly (Cherry fruit, European crane, Rangeland crane)
Forester (Eightspotted)
Fruitworm (Cherry, Cranberry, Green, Raspberry, Sparganothis, Strawberry, Tomato)
Girdler (Cranberry, Twig)
Grasshoppers
Grubs (White)
Hornworms (Poinsettia, Sweet potato, Tobacco, Tomato)
Leafcutter (Maple)
Leaffolder (Grape)
Leafhopper (Aster, Avocado, Cotton, Potato, Prune, Redbanded, Three cornered alfalfa, White apple)
Leafminer (Alfalfa blotch, Azalea, Birch, Boxwood, Holly, Oak, Tentiform)
Leafroller (Avocado, Filbert, Fruittree, Grape, Oak, Omnivorous, Redbanded, Strawberry, Variegated)
Leaftier (Omnivorous)
Leafworm (Cotton)

Lecanium (European fruit)
Lice
Looper (Alfalfa, Pine, Striped grass, Western hemlock)
Maggot (Apple, Blueberry)
Maker (Hackberry nipplegall)
Mapleworm (Greenstriped)
Mealworm (Lesser)
Mealybug (Apple, Cherry)
Melonworm
Midges (Gall)
Millipedes
Mites (Apple rust, Chicken, Citrus rust, Eriophyid, Fuschia gall, Fuschia?, Northern fowl, Pear rust, Pearleaf blister)
Moth (Browntail, Codling, Cyprus tip, Diamondback, Douglas-fir tussock, European pine shoot, Eyespotted bud, Grape berry, Gypsy, Holly bud, Lawn, Lucerne, Maple shoot, Nantucket pine tip, Oak, Oriental fruit, Pitch pine tip, Subtropical pine tip, Sunflower, Tussock, Western tussock)
Mosquito
Needleminers (Jeffrey pine, Spruce)
Notcher (Little leaf)
Oakworm (Orangestriped, Redhumped)
Orangedog (California)
Orangeworm (Navel)
Pandemis (Apple)
Peanutworm (Rednecked)
Pearslug (California)
Phylloxera (Pecan leaf?, Pecan?)
Pickleworm
Pillbug/Sowbugs
Pinworm (Tomato)
Prominent (Saddled)
Psylla (Pear)
Roseslug
Sawfly (European apple, Pear, Pine, Raspberry)
Scale (Black, Brown soft, Calico, California red, Citricola, Citrus Snow, Forbes, Frosted, Lecanium, Olive, Oystershell, Red, San Jose, Yellow)

Scorpions
Shrimp (Ghost, Mud, Tadpole)
Shuckworm (Hickory)
Silverfish
Skeletonizer (Oak, Western Grapeleaf)
Skipper (Essex, Fiery)
Spanworm (Elm)
Spiders
Spinx (Catalpa)
Spittlebug (Meadow, Pecan, Pine)
Springtails
Sucker (Apple)
Suckfly
Thornbug
Thrips
Ticks (Amblyomma spp., Bear, Blacklegged, Brown dog, Deer, Fowl, Ixodes spp., Lone star)
Tortrix (Orange)
Treehoppers
Wasps (Gall)
Webworm (Fall, Lesser, Mimosa, Sod)
Weevil (Alfalfa, Bluegrass, Chestnut nut, Citrus root, Clover head, Cotton boll, Egyptian alfalfa, Hyperodes, Pea Leaf?, Pea?, Pecan, Strawberry bud?, Strawberry?, Sugarcane rootstalk borer, Sunflower stem, Sweet potato, Yellow-poplar)

Whiteflies
Worm (Filbert)

Weeds

Aster
Blessed thistle
Boxelder
Plant regulator - abscission agen, flower inhibitor, fruit thinning, inhibit fruiting
White ash
Yellow poplar

Formulation Types Registered (% AI):

Technical Grade Material

Form not identified/solid	99.0000%
Manufacturing product dust	80.0000%
Emulsifiable concentrate	97.5000%

End Use Product

Bait/solid	10.0400%
Emulsifiable concentrate	22.5000 to 48.0000%
Flowable concentrate	43.0000 to 43.4000%
Granular	5.0000 to 7.0000%
Liquid-ready to use	39.7000%
Pelleted/tableted	5.0000%
Wettable powder	50.0000 to 85.0000%

Methods and Rates of Application:

Types of Treatment:

Animal bedding/litter treatment; Animal treatment (spray); Bait application; Band treatment; Bark treatment; Basal spray treatment; Broadcast; Chemigation; Dip treatment; Directed spray; Drench; Ground spray; High volume spray (dilute); Indoor general surface treatment; Low volume spray (concentrate); Mound drench; Mound treatment; Perimeter treatment; Premise treatment; Soil drench treatment; Soil incorporated treatment by irrigation; Soil treatment; Soil/media treatment; Spray; Surface treatment; Trunk drench; Ultra low volume

Equipment:

Airblast; Aircraft; Band sprayer; Chest-mounted equipment; Compressed air sprayer; Dip tank; Drencher; Electric fogger; Fogger; Granule applicator; Ground; Hand held duster; Hand held sprayer; High pressure sprayer; High volume ground sprayer; Hose-end sprayer; Hydraulic sprayer; Knapsack sprayer; Low pressure; Low pressure ground sprayer; Low volume ground sprayer; Mechanical sprayer; Mist blower; Mist sprayer; Not on label; Pail; Power sprayer; Pressure sprayer; Sprayer; Spreader; Sprinkler can; Sprinkler irrigation; Tank

Timing:

Bloom; Boot; Containerized; Cool weather (65 - 80 F); Delayed dormant; Dormant; Foliar; Fruit thinning; Heading; Nonbearing; Nurserystock; Petal fall; Pink; Plant bed; Popcorn; Post-bloom; Postharvest; Prebloom; Preharvest; Preplant; Seed bed; Silk;

Tassel; Transplant; When needed

Use Practice Limitations: (that apply to all uses on all
products)